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SUBSTITUTE PAGES

Claims

1. Method for transport of toner material in an electrophotographic printer or copier,

in which toner material (12) is transported from a reservoir (28) into the developer station (14) after the under-run of a lower first limit value of a first toner material quantity present in a developer station (14), whereby the transport reservoir in the filled state is filled with toner material at least until a second lower limit value,

at least the toner material quantity transported from the reservoir (16) to the developer station (14) is detected and stored,

toner material (12) is transported from a transport reservoir (16) into the reservoir (28) after the under-run of a lower second limit value of a second toner material quantity present in the reservoir (28),

and in which the detected toner material quantity is associated with the transport reservoir (16) from which the toner material (12) is extracted to fill the reservoir after the under-run of the second limit value, at least until reaching the second limit value.

2. Method according to claim 1, characterized in that the toner material quantity that is detected without a transport reservoir (16) (from which toner material (12) can be transported into the reservoir (28)) being present in the printer or copier is associated with a subsequently provided transport reservoir.

3. Method according to claim 1 or 2, characterized in that, after the under-run of the second limit value, toner material (12) is transported from the

transport reservoir (16) into the reservoir (28) at least until the second limit value is exceeded.

4. Method according to any of the preceding claims, characterized in that, after the under-run of the second limit value, toner material (12) is transported from the transport reservoir (16) into the reservoir (28) until an upper third limit value is reached and/or exceeded.

5. Method according to any of the preceding claims, characterized in that the determined total quantity (D) is compared with a fourth limit value associated with the transport reservoir (16), whereby the transport reservoir (16) is identified as empty upon reaching and/or exceeding the fourth limit value (K2).

6. Method according to claim 5, characterized in that state information that specifies whether toner material is present in the transport reservoir is stored in a storage range associated with the transport reservoir (16).

7. Method according to claim 5 or 6, characterized in that the number (D) of transport actions associated with the transport reservoir is only then compared with the fourth limit value (K2) after the third limit value has not been reached after a preset transport time and/or after a preset number of transport actions.

8. Method according to claim 7, characterized in that the preset transport time is determined from the number of transport actions with preset duration.

9. Method according to any of the preceding claims, characterized in that the first toner material quantity is determined with the aid of the toner concentration of the toner material-carrier particle mixture present in the

developer station (14), whereby the first limit value is the minimum toner concentration of the toner material-carrier particle mixture.

10. Method according to any of the preceding claims, characterized in that the reservoir is a buffer.

11. Method according to any of the preceding claims, characterized in that a preset quantity of temperature measurement event (12) is transported from the reservoir (16, 28) into the developer station (14) after the under-run of a minimum quantity of toner material (12) in the developer station (14).

12. Method according to claim 11, characterized in that the preset quantity is established via the control of the transport duration (t1, t2), whereby the transport capacity is essentially constant.

13. Method according to claim 12, characterized in that the transport duration (t1, t2) is hard-set for a transport action in the printer or copier.

14. Method according to claim 13, characterized in that the number (D) of the transport actions per reservoir (16, 28) is detected.

15. Method according to any of the preceding claims, characterized in that the toner material (12) is transported with the aid of a preset negative pressure.

16. Method according to any of the claims 11 through 15, characterized in that, at least in one region, the preset quantity of toner material (12) is transported with the aid of a paddlewheel and/or a transport spindle (34, 38) from the reservoir (16, 28) into the developer station (14), whereby the transported quantity is determined with the aid of the rotations of the paddlewheel or, respectively, of the transport spindle (34, 38).

17. Method according to claim 16, characterized in that the number of the rotations for a transport action is hard-set in the printer or copier.

18. Method according to claim 17, characterized in that the number of the rotations per transport action is controlled with the aid of the transport duration given an essentially constant drive rotation speed of the paddlewheel or, respectively, of the transport spindle (34, 38).

19. Method according to claim 18, characterized in that the number (D) of the transport actions is detected per reservoir (28).

20. Method according to any of the preceding claims, characterized in that at least one further transport action is implemented when the minimum quantity of temperature measurement event (12) in the developer station (14) is not achieved or exceeded after a transport action.

21. Method according to any of thermodynamic claims 5 through 20, characterized in that no toner material (12) is transported from the transport reservoir (28) when the state information specifies that toner material (12) is no longer contained in the transport reservoir (28).

22. Arrangement for transport of toner material in an electrophotographic printer or copier,

with a first transport device that transports toner material (12) from a reservoir (28) filled with toner material at least up to a second lower limit value into the developer station (14) after the under-run of a lower first limit value of a first toner material quantity present in a developer station (14),

with a device that at least detects the toner material quantity transported from the reservoir (28) to the developer station (14),

with a second transport device that transports toner material (12) from a transport reservoir (16) into the reservoir (16) after the under-run of a lower second limit value of a second toner material quantity present in the reservoir (28),

whereby the detected toner material quantity can be associated with the transport reservoir (16) from which the toner material (12) is extracted after the under-run of the second limit value at least until reaching this second limit value.

23. Arrangement according to claim 29 [sic], characterized in that the transport reservoir (16) comprises an information medium (60) on which at least the total number (D) of the transport actions associated with the transport reservoir (16) and/or the possible number of transport actions is applied as a limit value (K2) in a machine-readable format.

24. Method for determination of a fill state of a transport reservoir for toner material

in which toner material (12) is transported from a transport reservoir (28) into a developer station (14) with the aid of a toner transport system (10) of the printer or copier,

at least the toner material quantity (12) supplied to the developer station (14) is detected with the aid of the number of the implemented transport actions,

the detected transport actions are associated with the transport reservoir from which the toner material (12) is extracted for supply of the extracted toner material quantity,

and in which the number (D) of transport actions associated with the transport reservoir (28) is only then compared with a limit value (K2) after the minimum quantity of toner material in the developer station (14) or a further reservoir has not been reached after a preset number (K1) of successively implemented transport actions for transport of toner material from the transport reservoir (28).

25. Method according to claim 24, characterized in that the transport reservoir (28) is identified as empty after reaching and/or exceeding the limit value (K2) of the transport reservoir (28).

26. Method according to claim 25, characterized in that state information that specifies whether toner material (12) is present in the transport reservoir (28) is stored in a storage range (60) associated with the transport reservoir (28).

27. Device for determination of a fill state of a transport reservoir for toner material

with a toner transport system (10) that transports toner material (12) from a transport reservoir (28) into a developer station (14),

with a device to detect, with the aid of the number of the implemented transport actions, the toner material quantity (12) supplied to the developer station (14),

with means to compare the number of the transport action [sic] (D) associated with the transport reservoir (28) with a limit value (K2), whereby the means of comparison is only then conducted after the minimum quantity of toner material in the developer station (14) or in a buffer (16) has not been reached after a preset number (K1) of successively implemented transport actions,

with a storage range (60) that is associated with the transport reservoir (28) and in which state information can be stored, which state information specifies whether toner material (12) is present in the transport reservoir (28) [sic],

and whereby state information that specifies the state empty is stored upon reaching and/or exceeding the limit value (K2).

28. Transport reservoir for transport of toner material,

with a storage means (60), connected with the transport reservoir (28), that has at least a first storage range in which can be stored the number of the transport actions associated with the transport reservoir (28),

and that has a second storage range in which can be stored state information that specifies that no toner material (12) is present in the transport reservoir (28).